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Code-excited linear prediction(CELP): High-quality speech at very low bit rates

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Abstract

We describe in this paper a code-excited linear predictive coder in which the optimum innovation sequence is selected from a code book of stored sequences to optimize a given fidelity criterion. Each innovation sequence is filtered sequentially through two time-varying linear recursive filter delay (related to pitch period) predictor in the feedback loop and the other with a short-dead time spectral envelope) in the feedback loop. We code speech, sampled at 8 kHz, in blocks. Each block consisting of 40 samples is produced from one of 1024 possible innovation sequences. For the innovation sequence is thus 1/4 bit per sample. We compare in this paper several deterministic code books for their effectiveness in providing the optimum innovation sequence. Our results indicate that a random code book has a slight speech quality advantage at low bit rates. The speech produced by the above method will be played at the conference.

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